

BACHELOR OF SCIENCE IN BIOTECHNOLOGY

COURSE SPECIFICATION

SH03007 : ANIMAL CELL TECHNOLOGY LABORATORY

I. Information about the course

- Semester: 7
- Number of credits: 01 (Theoretical: 0 – Practice: 1 – Self-studying: 03. According to the regulations, each theoretical session is converted into 2 practice sessions)
- Credit hours for learning activities
 - + Class discussion: 02 periods
 - + Practical animal cell technology in the laboratory: 28 periods +
 - Self-studying: 90 periods (according to individual plans, and based on the lecturer’s instructions)
- Department conducting the course:
 - Department: Animal Biotechnology
 - Faculty: Biotechnology
- The course belongs to the following knowledge group:

General knowledge <input type="checkbox"/>		Foundation knowledge <input checked="" type="checkbox"/>		Specialized knowledge <input type="checkbox"/>	
Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input type="checkbox"/>	Elective <input type="checkbox"/>	Compulsory <input checked="" type="checkbox"/>	Elective <input type="checkbox"/>

- Parallel course: Animal cell technology
- Prerequisite course: none.
- Language used for teaching: English Vietnamese

II. Course objectives and course expected learning outcome

*** The objectives of the course:**

The course aims to provide students with the following knowledge:

- + Scientific basis, principles of laboratory techniques: determination of sperm quality; egg; cell separation techniques;
- + Scientific basis and principles of animal tissue culture techniques
- + Scientific basis of methods to assess the quality of eggs and sperm qualified for artificial insemination

The course aims to provide students with the following skills:

- + Work independently
- + Applying learned knowledge to distinguish different types of sperm: straight motile spermatozoa, malformed spermatozoa, immature spermatozoa.
- + Apply learned knowledge to distinguish the types of eggs obtained in follicles, evaluate the eggs that are capable of culturing.

The course helps students develop the following qualities:

+ Students are proactive in acquiring knowledge, ready to help and share experiences with friends and colleagues

*** The Expected Learning Outcomes for the *Bachelor of Biotechnology* program**

Expected learning outcomes (ELOs) of the Bachelor of Science in Biotechnology program		Cognitive level
Upon graduation, graduates would be able to:		
General Knowledge	ELO1: Apply knowledge of mathematics, social sciences, natural sciences, laws, and contemporary issues into the field of biotechnology.	Apply
	ELO 2: Analyze the needs and requirements of stakeholders for the purposes of management, production, and sales of biotechnology products.	Analyze
Professional Knowledge	ELO3: Evaluate the quality of biotechnology products with regard to biosafety standards, environmental protection, legal, and ethical standards.	Evaluate
	ELO4: Develop ideas for biotechnology products based on personal knowledge of natural sciences, life sciences, and analysis of social needs.	Create
	ELO5: Design production models for biotechnology products	Create
General Skills	ELO6: Apply critical and creative thinking skills to effectively solve issues related to research, technology transfer, and production in the field of biotechnology.	Adaptation
	ELO7: Coordinate with team members to achieve set goals, either as a team member or team leader.	Origination
	ELO8: Communicate effectively through various channels in the diverse contexts of the workplace; satisfy English proficiency levels as required by the Ministry of Education and Training.	Origination
Professional Skills	ELO9: Utilize information technology and equipment effectively for management, production, and sales in the field of biotechnology.	Adaptation
	ELO10: Use appropriate methods and skills to collect, analyze, interpret data in scientific research, and examine practical issues at the workplace.	Adaptation
	ELO11: Perform basic and intensive technical procedures	Adaptation

Expected learning outcomes (ELOs) of the Bachelor of Science in Biotechnology program		Cognitive level
Upon graduation, graduates would be able to:		
	fluently in the field of biotechnology	
	ELO12: Advise customers and partners on biotechnology products with a positive business perspective.	Adaptation
Attitude	ELO13: Comply with the laws of the biotechnology industry, and conform to occupational safety principles at the workplace.	Valuing
	ELO14: Maintain professional ethics, fulfill one's duty to improve the well-being of the society, and protect the environment.	Valuing
	ELO15: Perform the habits of updating knowledge and experiences to improve one's professional qualifications	Characterizing

*** Course expected learning outcomes (CELOs):**

The course contributes to the expected learning outcomes of the program at the following levels: *I - Introduction*); *P - Practice*; *R - Reinforce*; *M –Master*

Course code	Course name	Contribution level towards the expected learning outcomes of the program							
		ELO1	ELO2	ELO3	ELO4	ELO5	ELO6	ELO7	ELO8
SH02003	Cell Technology			M				P	
		ELO9	ELO10	ELO11	ELO12	ELO13	ELO14	ELO15	
		R	R	M		M			

Code	Course expected learning outcomes Upon completion of this course, students are able to:	ELOs of the program
Knowledge		
K1	Evaluation of chemical quality before mixing for experiments	ELO3
K2	Evaluate the quality of cells, sperms, eggs	ELO3
Skills		
K3	Proficient implementation of basic equipment in the animal cell culture room; Basic techniques of animal cell culture.	ELO11
K4	Using biotechnological tools to evaluate and preserve cells for cell culture <i>in vitro</i>	ELO9, ELO10

Attitude		
Attitude	Comply with laboratory regulations and biotech safety principles	ELO13
	Comply the rules of practice lecture	ELO13

III. Course description

SH03007 : Animal cell technology laboratory (7 credits: 1 – 0 - 3).

The course consists of the following chapters:

- Chapter 1: Basic techniques in dispensing and preservation some kind of medium and how to use some major equipment in biotech laboratory animals
- Chapter 2: Collecting, operation and classification egg of higher animals
- Chapter 3: Multiplication culture in vitro and cryopreservation of animal cells
- Chapter 4: Evaluation some indicators of animal sperm

IV. Teaching and learning methods

1. Teaching methods

- Instructors guide practical operations in the laboratory
- Explain the role of the practical steps
- Instructions for analyzing the obtained results

2. Learning methods

- Students read the documents themselves, conduct practical operations, observe and monitor practice samples, record and analyze the results obtained.

V. Requirements for students

-Attendance: Must attend 100% of the total number of practical lessons of the course.

Preparation for the lecture: Students are required to read lecture notes, text books and references before attending the class.

Group discussion and presentation: Students are required to engage in group discussion.

Formative assessment: Students who do not have any practical results will be graded with zero.

Final assessment: All students participating in this module must have their practice results and hard-copy reports.

VI. Scoring and assessment

1. Scale: 10

2.The average score of the course is score of each rubric multiplying with the corresponding weight of each rubric

- Formative assessment: 30%
- Final exam: 70%

3. Assessment methods

Rubrics and assessment method	CELOs to be assessed	Weight (%)	Time / Studying week
<i>Progress assessment</i>		30	

Class participation (Rubric 1)	K5, K6	10	Week 1-6
Assess proficiency in the use of practical equipment (Rubric 2)	K1, K3	20	Week 1-5
End-of-course assessment		70	
Evaluation of sperm and egg identification results (Rubric 3)	K2	50	Week 6
Practice report (Rubric 4)	K4	20	Week 6

Rubric 1: Class participation

Criteria	Weighting (%)	Excellence 8.5 – 10 point	Good 6.5 – 8.4 point	Fair 4.0 – 6.4 point	Poor 0 – 3.9 point
Level of engagement and behavior	50	Always listening attentively and contributing actively to class's activities	Mostly listening attentive and contributing to class's activities	Listening attentively	Not listening attentively
Attending class	50	Come to practical class on time the prescribed	Come to practical class late than the prescribed one time	Come to practical class late than the prescribed two times	Come to practical class late than the prescribed more than two times

Rubric 2: Assess proficiency in the use of practical equipment

Criteria	Weight (%)	Excellent 8.5 – 10 (A)	Good 6.5 – 8.4 (C+, B, B+)	Average 4.0 – 6.4 (D, D+, C)	Poor 0 – 3.9 (F)
Assess proficiency in the use of practical equipment	40%	Fully and accurately operate and proficiently use 90-100% of the necessary equipment in the subject	Fully and accurately operate and proficiently use 75-89% of the necessary equipment in the subject, with minor errors	Fully and accurately operate and proficiently use 50-74% of the necessary equipment in the subject, there was a big error	Inadequate/Failed to meet requirements
	20%	Explain and demonstrate results clearly	Explain and demonstrate the results quite clearly	Explain and demonstrate less obvious results	Explain and demonstrate the results not clearly
	20%	Correct action within the allotted time	Correct operation, 1 to 2 minutes slower than the	Correct operation, more than 2 minutes behind	The operation is not correct, more than 2 minutes later than the

			specified time	the specified time	specified time
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Rubric 3: Evaluation of sperm and egg identification results

Criteria	Weight (%)	Excellent 8.5 – 10 (A)	Good 6.5 – 8.4 (C+, B, B+)	Average 4.0 – 6.4 (D, D+, C)	Poor 0 – 3.9 (F)
Evaluation of sperm and egg identification results	70%	Accurately assess the quality of sperm, classify the types of eggs of pigs	Assessing the quality of sperm, classifying pig eggs but not exactly, there are small errors	Assessing the quality of sperm, classifying pig eggs, but there is an important error	Can't assess sperm quality, can't classify pig eggs
	30%	Correct action within the allotted time	Correct operation, 1 to 2 minutes slower than the specified time	Correct operation, more than 2 minutes behind the specified time	The operation is not correct, more than 2 minutes later than the specified time

Rubric 4: Practice report

Criteria	Weight (%)	Excellent 8.5 – 10 (A)	Good 6.5 – 8.4 (C+, B, B+)	Average 4.0 – 6.4 (D, D+, C)	Poor 0 – 3.9 (F)
Assess proficiency in the use of practical equipment	50%	Correct format, submit assignments on time	Correct format, submit assignments on time, there are some spelling mistakes	Not correct format or submit assignments on time	Not correct format and submit assignments on time
	50%	Practice results are presented fully, clearly and logically	Practice results are presented fully, but not clearly and logically	Practice results are not fully presented	Practice results are not fully presented, there are many errors

4. Requirements of the course

- Regulations on students' ineligibility for the end-of-term assessment: leave from school from 01 practical lesson
- Students who do not prepare homework at the request of the teacher will not be able to participate in class lessons

VII. Textbook and reference materials

* *Textbook /Lectures:*

1. Lecture on practical course on animal cell technology in 2020 compiled by the department
2. Nguyen Van Thanh, Tran Tien Dung, Su Thanh Long, Nguyen Thi Mai Tho, Nguyen Cong Toan, Hoang Kim Giao (2017). Textbook of Animal Reproduction Technology. Agricultural University House.

VIII. Course outline

Week	Contents	Course expected learning outcome
	<i>1st Practice: Basic techniques in preparation, preservation of media and equipment in animal laboratory</i>	
	<i>A/ Main contents: (5 hrs)</i> Theory and Practice: 1.1. Preparation, preservation and utilisation of media in Animal Biotechnology Laboratory 1.2. Utilisation of equipment	K1, K3, K6
	<i>B/ Self-study contents: (15 hrs)</i> Reading text book and information concerning practice.	K5
	<i>2nd Practice: Collection, manipulation of follicular oocytes from mammalian ovary</i>	
	<i>A/ Main contents: (10 hrs)</i> Theory and Practice: 2.1. Follicular oocyte collection from ovary 2.2. Mammalian oocyte manipulation 2.3. Oocytes classification by binocular microscope	K2, K3, K4, K6
	<i>B/ Self-study contents: (30 hrs)</i> Reading text book and information concerning practice.	K5
	<i>3rd Practice: In vitro culture and animal cell cryopreservation</i>	
	<i>A/ Main contents: (10 hrs)</i> Theory and Practice: 3.1. Collection, quantitative and qualitative evaluation of cells 3.2. In vitro culture 3.3. Cell cryopreservation	K2, K3, K4, K6
	<i>B/ Self-study contents: (30 hrs)</i> Reading text book and information concerning practice.	K5
	<i>4th Practice: Evaluation of mammalian semen</i>	
	<i>A/ Main contents: (05 hrs)</i> Theory and Practice: 4.1. Hematocytometer and sperm preparation 4.2. Sperm quantity determination 4.3. Abnormal sperm determination	K2, K3, K4, K6

	B/ Self-study contents: (15 hrs) Reading text book and information concerning practice.	K5
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IX. Facility and other requirements:

- Classrooms: required to have enough tables, chairs, boards, chalks, adequate lighting, good soundproofing, ventilation, orderliness, neatness and cleanliness.
- Practical room: fully equipped with experimental equipment (Optical microscope, stereo microscope, analytical balance, centrifuge, table and chairs.
- Teaching facilities: have internet connection, projector, microphone, speaker.
- E-learning/MS Teams system works well

X. Revisions (The course specification is revised annually according to the regulations of the University)

- 1st revision: 7/2018
- 2nd revision: 7/2019
- 3rd revision: 7/2020

Hanoi, July 29th, 2020

HEAD OF DEPARTMENT

(Name and signature)

LECTURER

(Name and signature)

DEAN

(Name and signature)

Tran Thi Binh Nguyen

**ON BEHALF OF THE PRESIDENT
VICE PRESIDENT**

APPENDIX

LIST OF LECTURERS AND ASSISTANTS FOR THE COURSE

Lecturer in charge of the course

Full name: Nguyễn Hữu Đức	Title / Degree: PhD
Workplace address: Department of Animal Biotechnology, Faculty of Biotechnology, Vietnam Agricultural Students, Trau Quy, Gia Lam, Hanoi.	Phone no.: 01699606099
Email: nhduc@vnua.edu.vn	Website https://cnsh.vnua.edu.vn/
How to contact the lecturer: Students can contact the lecturer by phone, email address. Students can also meet the lecturer during office hours (informed by the lecturer), or they can arrange a meeting to see the lecturer directly.	

Supporting lecturer

Full name: Tran Thi Binh Nguyen	Title / Degree: PhD
Workplace address: Department of Animal Biotechnology, Faculty of Biotechnology, Vietnam Agricultural Students, Trau Quy, Gia Lam, Hanoi.	Phone no.: 0944661010
Email: ttbnguyen@vnua.edu.vn	Website https://cnsh.vnua.edu.vn/
How to contact the lecturer: Students can contact the lecturer by phone, email address. Students can also meet the lecturer during office hours (informed by the lecturer), or they can arrange a meeting to see the lecturer directly.	